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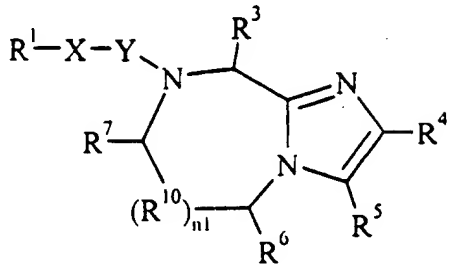
CLAIMS

What is claimed is:

1. A compound of formula I,



(I)

wherein

n1 is 0 or 1;

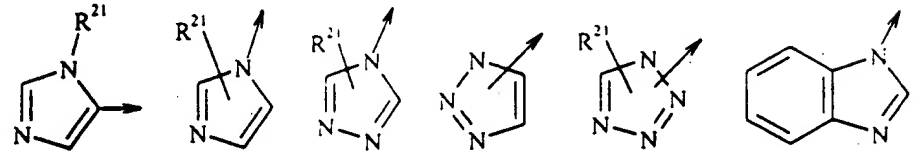
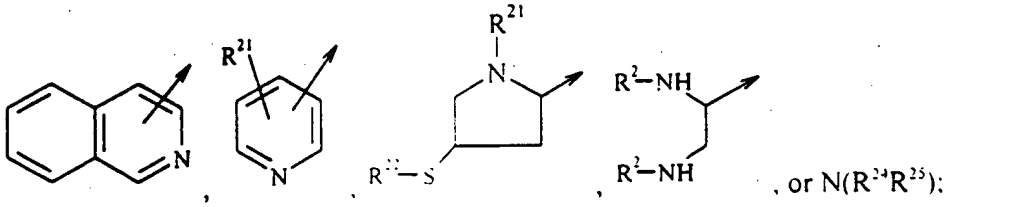
X is, independently for each occurrence, $(CHR^{11})_{n3}(CH_2)_{n4}Z(CH_2)_{n5}$;

Z is O, $N(R^{12})$, S, or a bond;

n3 is, independently for each occurrence, 0 or 1;

n4 and n5 each is, independently for each occurrence, 0, 1, 2, or 3;

Y is, independently for each occurrence, CO, CH_2, CS, or a bond;

R^1 is  ,  , or $N(R^{24}R^{25})$;

R^2, R^{11}, and R^{12} each is independently for each occurrence, H or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl and aryl, wherein said optionally substituted moiety is optionally substituted with one or more of R^* or R^{30};

R^3 is, independently for each occurrence, H or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl, (C_{2-6})alkenyl, (C_{2-6})alkynyl, (C_{3-6})cycloalkyl, (C_{3-6})cycloalkyl(C_{1-6})alkyl, (C_{5-7})cycloalkenyl, (C_{5-7})cycloalkenyl(C_{1-6})alkyl, aryl, aryl(C_{1-6})alkyl, heterocyclyl, and heterocyclyl(C_{1-6})alkyl, wherein said optionally substituted moiety is optionally substituted with one or more R^{30};

R^4 and R^5 each is, independently for each occurrence, H or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl, (C_{3-6})cycloalkyl, aryl, and heterocyclyl, wherein said optionally substituted moiety is optionally substituted with one or more R^{30}, wherein each said substituent is independently selected, or R^4 and R^5 can be taken together with the carbons to which they are attached to form aryl;

R^6 is, independently for each occurrence, H or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl, (C_{2-6})alkenyl, (C_{3-6})cycloalkyl, (C_{3-6})cycloalkyl(C_{1-6})alkyl, (C_{5-7})cycloalkenyl, (C_{5-7})cycloalkenyl(C_{1-6})alkyl, aryl, aryl(C_{1-6})alkyl, heterocyclyl, and heterocyclyl(C_{1-6})alkyl, wherein said optionally substituted moiety is optionally substituted with one or more substituents each independently selected from the group consisting of OH, (C_{1-6})alkyl, (C_{1-6})alkoxy, -$N(R^8R^9)$, -COOH, -$CON(R^8R^9)$, and halo,

where R^8 and R^9 each is, independently for each occurrence, H, (C_{1-6})alkyl, (C_{2-6})alkenyl, (C_{2-6})alkynyl, aryl, or aryl(C_{1-6})alkyl;

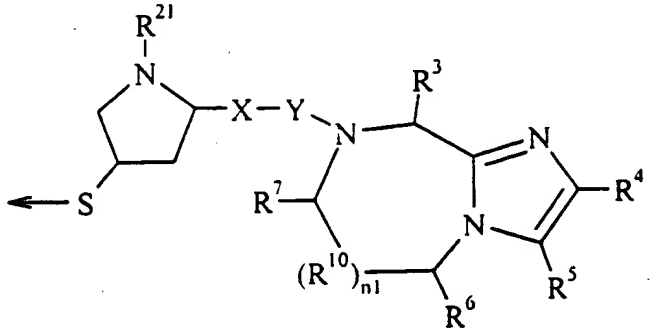
R^7 is, independently for each occurrence, H, =O, =S, or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl, (C_{2-6})alkenyl, (C_{3-6})cycloalkyl, (C_{3-6})cycloalkyl(C_{1-6})alkyl, (C_{5-7})cycloalkenyl, (C_{5-7})cycloalkenyl(C_{1-6})alkyl, aryl, aryl(C_{1-6})alkyl, heterocyclyl, and heterocyclyl(C_{1-6})alkyl, wherein said optionally substituted moiety is optionally substituted with one or more substituents each independently selected from the group consisting of OH, (C_{1-6})alkyl, (C_{1-6})alkoxy, -$N(R^8R^9)$, -COOH, -$CON(R^8R^9)$, and halo;

R^{10} is C;

or when n1 = 0, R^6 and R^7 can be taken together with the carbon atoms to which they are attached to form aryl or cyclohexyl;

R^{21} is, independently for each occurrence, H or an optionally substituted moiety selected from the group consisting of (C_{1-6})alkyl and aryl(C_{1-6})alkyl, wherein said optionally substituted moiety is optionally substituted with one or more substituents each independently selected from the group consisting of R^8 and R^{30};

R^{22} is H, (C_{1-6})alkylthio, (C_{3-6})cycloalkylthio, R^8–CO-, or a substituent according to the formula



;

R^{24} and R^{25} each is, independently for each occurrence, H, (C_{1-6})alkyl, or aryl(C_{1-6})alkyl;

R^{30} is, independently for each occurrence, (C_{1-6})alkyl, -O-R^8, -$S(O)_{n6}R^8$, -$S(O)_{n7}N(R^8R^9)$, -$N(R^8R^9)$, -CN, -NO_2, -CO_2R^8, -$CON(R^8R^9)$, -NCO-R^8, or halogen;

n6 and n7 each is, independently for each occurrence, 0, 1, or 2;

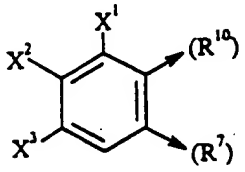
wherein said heterocyclyl is azepinyl, benzimidazolyl, benzisoxazolyl, benzofurazanyl, benzopyranyl, benzothiopyranyl, benzofuryl, benzothiazolyl, benzothienyl, benzoxazolyl, chromanyl, cinnolinyl, dihydrobenzofuryl, dihydrobenzothienyl, dihydrobenzothiopyranyl, dihydrobenzothio-pyranyl sulfone, furyl, imidazolidinyl, imidazolinyl, imidazolyl, indolinyl, indolyl, isochromanyl, isoindolinyl, isoquinolinyl, isothiazolidinyl, isothiazolyl, isothiazolidinyl, morpholinyl, naphthyridinyl, oxadiazolyl, 2-oxoazepinyl, 2-oxopiperazinyl, 2-

oxopiperidinyl, 2-oxopyrrolidinyl, piperidyl, piperazinyl, pyridyl, pyridyl N-oxide, quinoxalinyl, tetrahydrofuryl, tetrahydroisoquinolinyl, tetrahydro-quinolinyl, thiamorpholinyl, thiamorpholinyl sulfoxide, thiazolyl, thiazolinyl, thienofuryl, thienothienyl, or thienyl; and

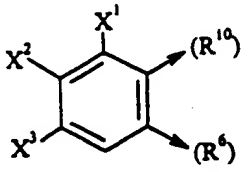
wherein said aryl is phenyl or naphthyl;

provided that:

when n1 = 1, R^{10} is C and R^6 is H, then R^{10} and R^7 can be taken together to form



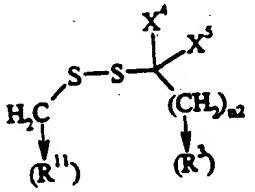
; or when n1 = 1, R^{10} is C, and R^7 is =O, -H, or =S, then R^{10} and R^6 can be taken together to form



,

wherein X^1, X^2, and X^3 each is, independently, H, halogen, $-NO_2$, $-NCO-R^8$, $-CO_2R^8$, -CN, or $-CON(R^8R^9)$; and

when R^1 is $N(R^{24}R^{25})$, then n3 is 1, n4 and n5 each is 0, Z is a bond, and R^3 and R^{11} can be taken together to form

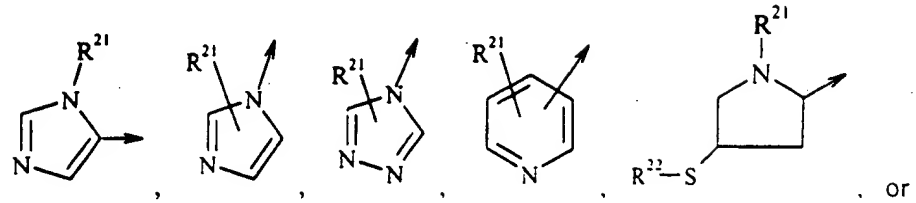


,

wherein n2 is 1-6, and X^4 and X^5 each is, independently, H, (C_{1-6})alkyl, or aryl, or X^4 and X^5 can be taken together to form (C_{3-6})cycloalkyl;

or a pharmaceutically acceptable salt thereof.

2. A compound according to claim 1, wherein:

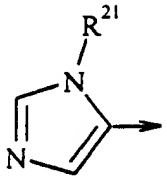
R^1 is  or

$N(R^{24}R^{25})$; and

X is $CH(R^{11})_{n3}(CH_2)_{n4}$ or Z, wherein Z is O, S, or $N(R^{12})$;

or a pharmaceutically acceptable salt thereof.

3. A compound according to claim 2, wherein:

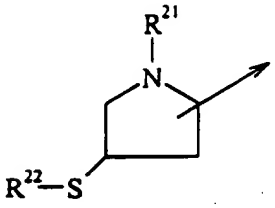
R^1 is  ;

X is $CH(R^{11})_{n3}(CH_2)_{n4}$; and

n1 is 0;

or a pharmaceutically acceptable salt thereof.

4. A compound according to claim 2, wherein:

R^1 is  ;

n3, n4, and n5 each is 0;

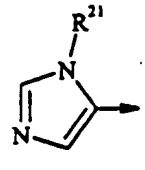
Z is a bond;

Y is, independently for each occurrence, CO or CS; and

n1 is 0;

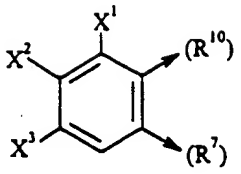
or a pharmaceutically acceptable salt thereof.

5. A compound according to claim 2, wherein:

R^1 is  ;

R^6 is H;

n1 is 1;

R^7 and R^{10} are taken together to form  ;

n3 is 1 and R^{11} is H;

Z is O or a bond;

n5 is 0; and

Y is CO, CH_2, or a bond;

or a pharmaceutically acceptable salt thereof.

6. A compound according to claim 2, wherein:

R^1 is $N(R^{24}R^{25})$;

n1 is 0;

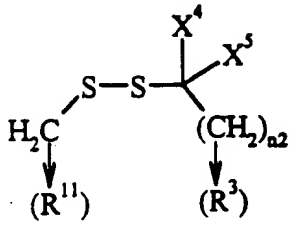
n3 is 1;

n4 is 0;

n5 is 0;

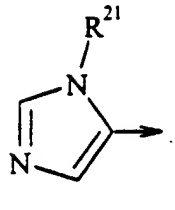
Y is CO or CS;

Z is a bond; and

R^3 and R^{11} are taken together to form  ,

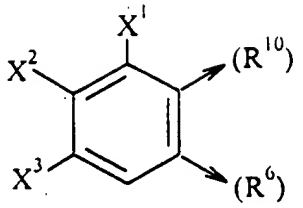
or a pharmaceutically acceptable salt thereof.

7. A compound according to claim 2, wherein:

R^1 is  ;

R^7 is H or =O;

n1 is 1;

R^6 and R^{10} are taken together to form  ;

n3 is 1 and R^{11} is H;

n5 is 0;

Y is CO or CH_2; and

Z is O or a bond;

or a pharmaceutically acceptable salt thereof.

8. A compound according to claim 3, wherein said compound is

8-butyl-7-(3-(imidazol-5-yl)-1-oxopropyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

8-butyl-2-(2-hydroxyphenyl)-7-(imidazol-4-yl-propyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

8-butyl-7-(4-imidazolylpropyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(2-(imidazol-4-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-8-(1-methylpropyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

2-(2-methoxyphenyl)-8-(1-methylpropyl)-7-(1-oxo-2-(1-(phenylmethyl)-imidazol-5-yl)ethyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

2-(2-methoxyphenyl)-8-(1-methylpropyl)-7-(2-(1-phenylmethyl)-imidazol-5-yl)ethyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(2-(1-(4-cyanophenylmethyl)-imidazol-5-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-8-(1-methylpropyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-((1H-imidazol-4-yl)methyl)-2-(2-methoxyphenyl)-8-(1-methylpropyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-((4-imidazolyl)carbonyl)-2-(2-methoxyphenyl)-8-(1-methylpropyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(1-(4-cyanophenylmethyl)-imidazol-5-yl)methyl-2-(2-methoxyphenyl)-8-(1-methylpropyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(2-(4-cyanophenylmethyl)-imidazol-5-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine;

5-butyl-7-(2-(4-cyanophenylmethylimidazol-5-yl)-1-oxo-ethyl)-2-phenyl-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

6-butyl-7-(2-(4-cyanophenylmethylimidazol-5-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine;

6-butyl-7-(2-(4-cyanophenylmethylimidazol-5-yl)-1-oxo-ethyl)-2-phenyl-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine;

5-butyl-7-(2-(1-(4-cyanophenylmethyl)-imidazole-5-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(2-(1-(4-cyanophenylmethyl)-imidazole-5-yl)-1-oxo-ethyl)-8-(cyclohexylmethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

5-butyl-7-(2-(1H-imidazole-5-yl)-1-oxo-ethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine;

7-(2-(4-cyanophenylmethyl)-imidazol-5-yl)-1-oxo-ethyl)-2-(2-(phenylmethoxy)-phenyl)-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine; or

2-(2-butoxyphenyl)-7-(2-(4-cyanophenylmethyl)-imidazol-5-yl)-1-oxo-ethyl)-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazine;

or a pharmaceutically acceptable salt thereof.

9. A compound according to claim 5, wherein said compound is

1,2-dihydro-1-((1H-imidazol-4-yl)methyl)-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine ;

9-bromo-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

9-Chloro-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

10-Bromo-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-8-fluoro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine; or

or a pharmaceutically acceptable salt thereof.

10. A compound according to claim 9, wherein said compound is

1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine ;

9-bromo-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

9-Chloro-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

10-Bromo-1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

1-(2-(1-(4-cyanophenylmethyl)imidazol-4-yl)-1-oxoethyl)-1,2-dihydro-8-fluoro-4-(2-methoxyphenyl)-imidazo[1,2-c][1,4]benzodiazepine;

11. A compound according to claim 6, wherein said compound is

7-(2-amino-1-oxo-3-thiopropyl)-8-(mercaptoethyl)-2-(2-methoxyphenyl)-5,6,7,8-tetrahydroimidazo[1,2a]pyrazine disulfide;

or a pharmaceutically acceptable salt thereof.

12. A compound according to claim 7, wherein said compound is

5-(2-(1-(4-cyanophenylmethyl)-imidazol-5-yl)-1-oxo-ethyl)-5,6-dihydro-2-phenyl-1H-imidazo[1,2-a][1,4]benzodiazepine;

or a pharmaceutically acceptable salt thereof.

13. A compound according to claim 2 wherein said compound is

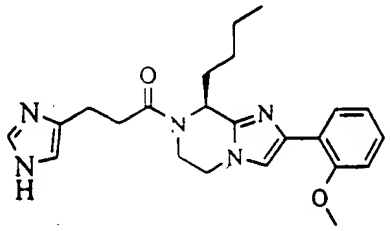
1,2-dihydro-1-(2-(imidazol-1-yl)-1-oxoethyl)-4-(2-methoxyphenyl) imidazo[1,2a][1,4]benzodiazepine;

1,2-dihydro-4-(2-methoxyphenyl)-1-(2-(pyridin-3-yl)-1-oxoethyl) imidazo[1,2a][1,4]benzodiazepine; or

1,2-dihydro-4-(2-methoxyphenyl)-1-(2-(pyridin-4-yl)-1-oxoethyl) imidazo[1,2a][1,4]benzodiazepine;

or a pharmaceutically acceptable salt thereof.

14. A compound according to claim 2, wherein said compound is



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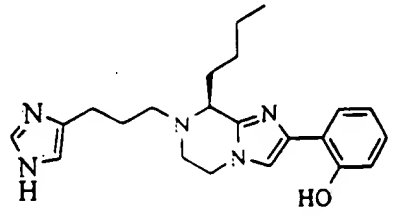

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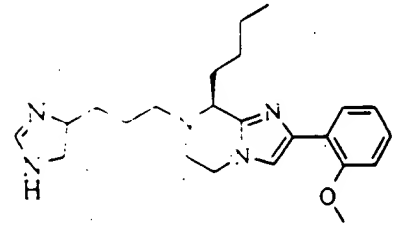

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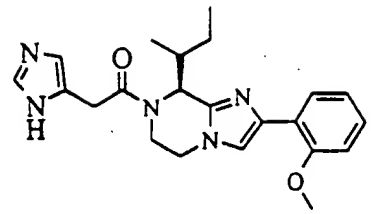
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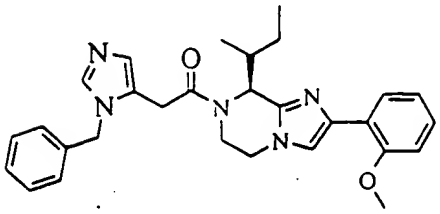
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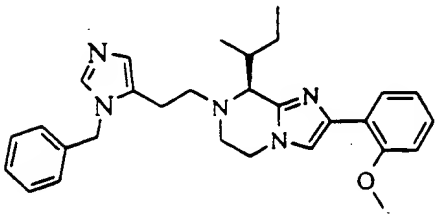
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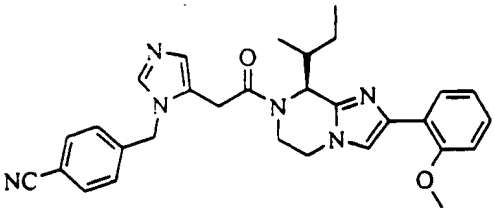
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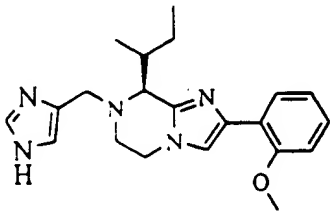
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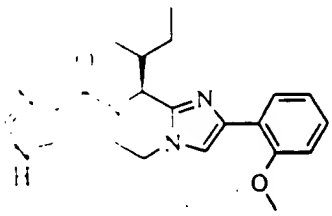
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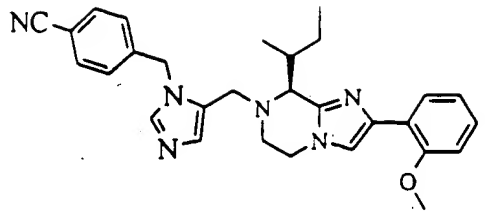
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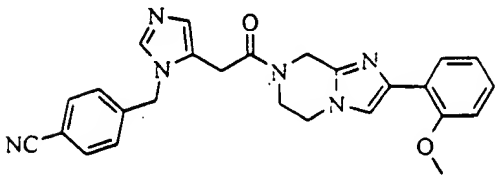
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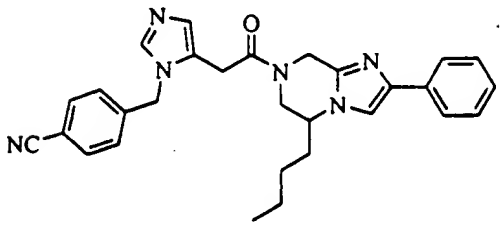
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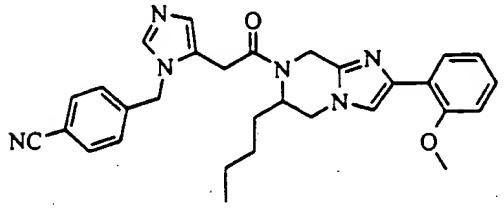
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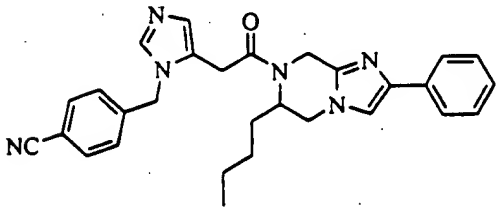
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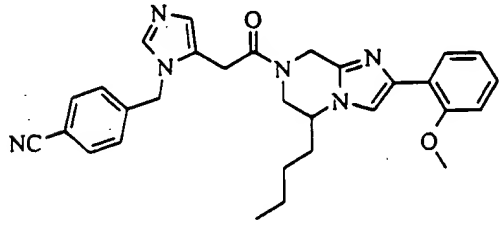
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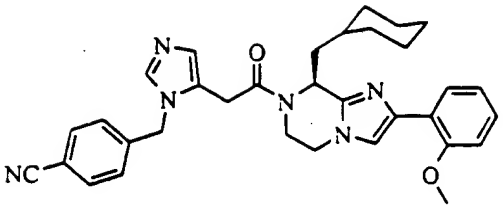

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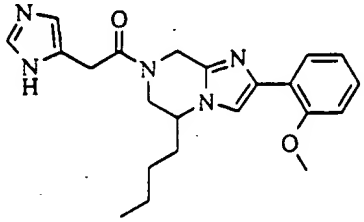

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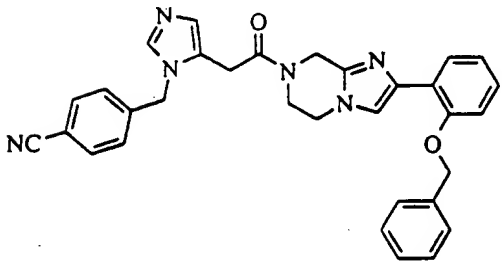

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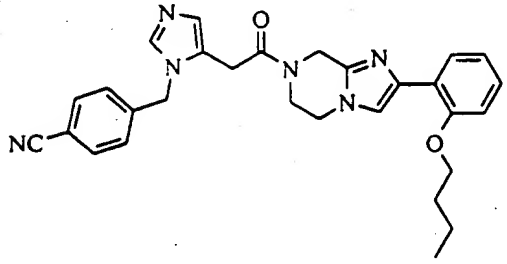

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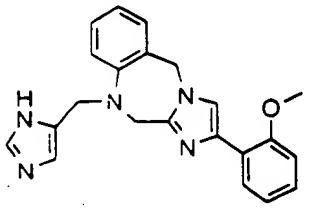

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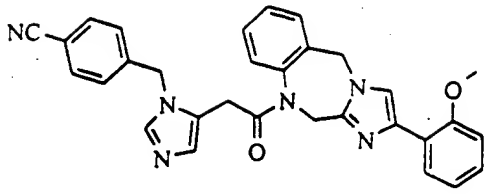

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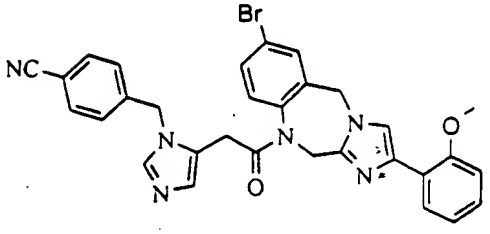

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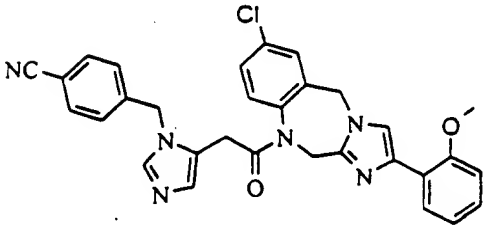

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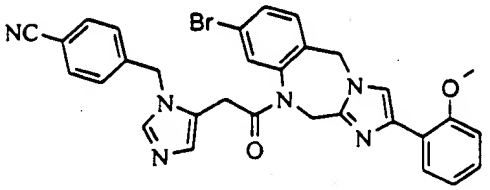

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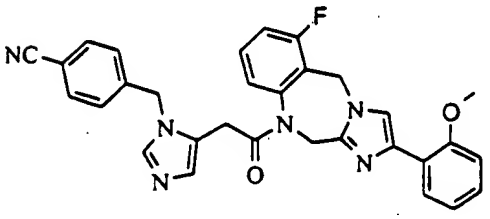

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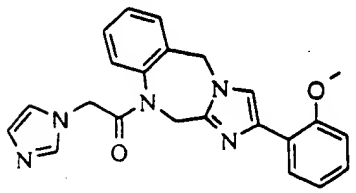

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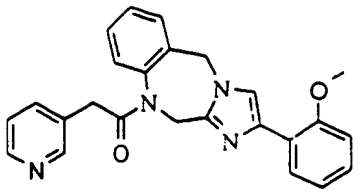
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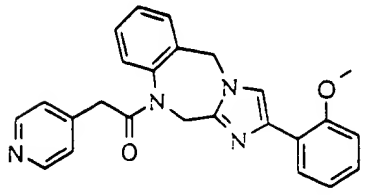
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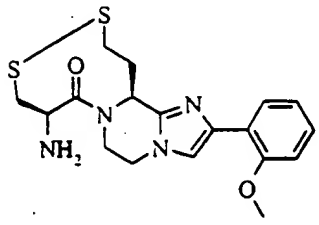
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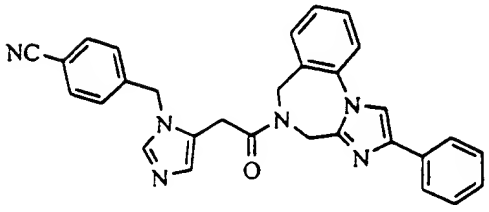
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or a pharmaceutically acceptable salt thereof.

15. A pharmaceutical composition comprising an effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier.

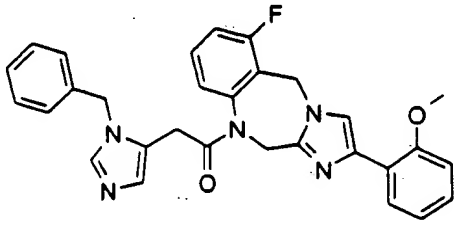
16. A method of treating a disease in a subject in need thereof, said method comprising administering to said subject a therapeutically effective amount of a compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein said disease is selected from the group consisting of fibrosis, benign prostatic hyperplasia, atherosclerosis, restenosis, breast cancer, colon cancer, pancreas cancer,

prostate cancer, lung cancer, ovarian cancer, epidermal cancer, hematopoietic cancer, and hepatitis delta virus infection.

17. A method of treating a disease in a subject in need thereof, said method comprising administering to said subject a therapeutically effective amount of a compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein said disease is a Ras-dependent tumor.

18. A method of inhibiting prenyl transferase in a subject in need thereof, said method comprising administering to said subject a therapeutically effective amount of a compound of claim 1, or a pharmaceutically acceptable salt thereof.

19. A compound according to claim 2, wherein said compound is



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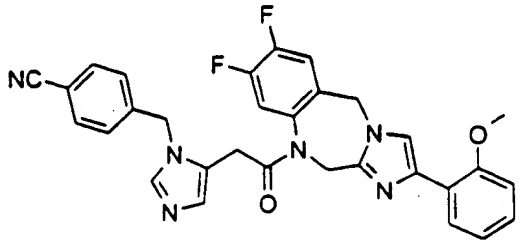

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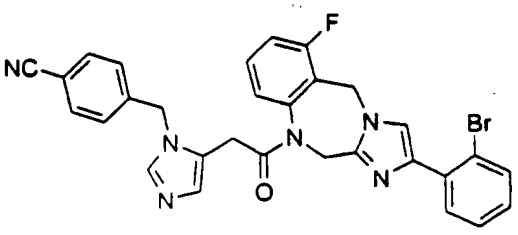

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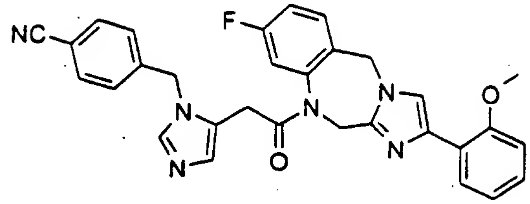
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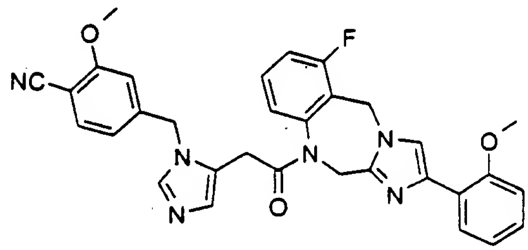
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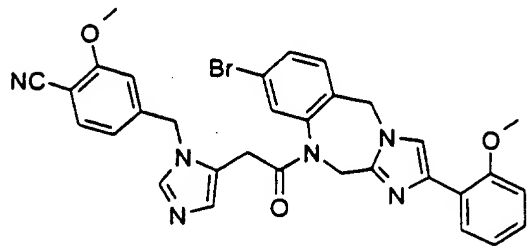
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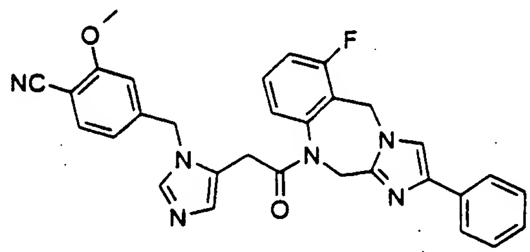
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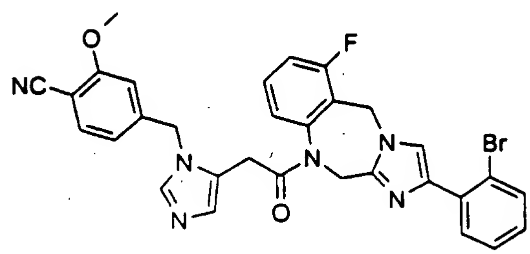
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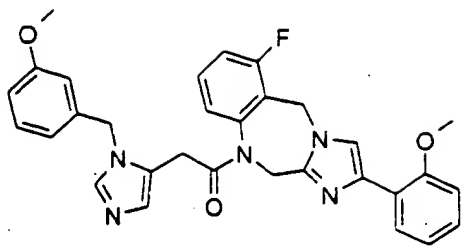

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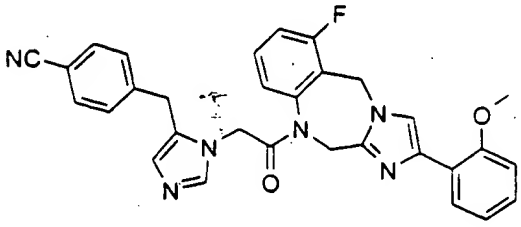

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or a pharmaceutically acceptable salt thereof.

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